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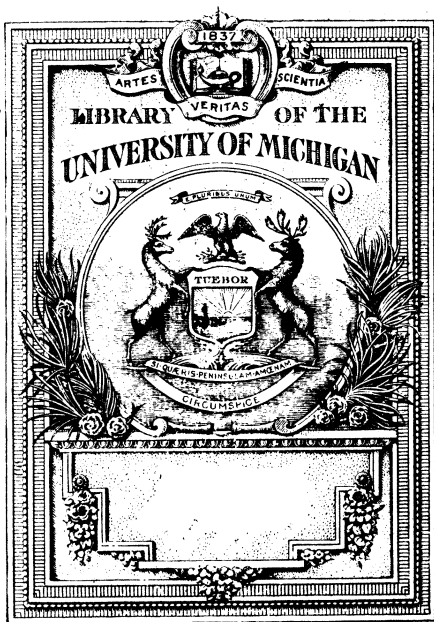
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THE  
RIFLE SHOT'S MANUAL

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H. SMITH



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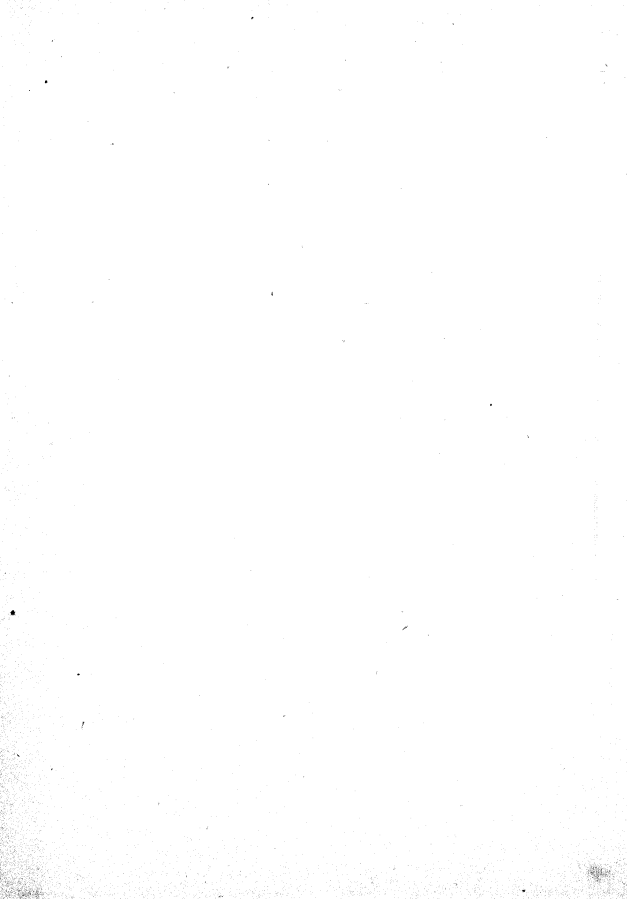
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# THE RIFLE SHOT'S MANUAL.



THE  
RIFLE SHOT'S MANUAL

*GIVING HINTS HOW  
TO ATTAIN CLOSE AND ACCURATE RIFLE  
SHOOTING.*

BY  
HENRY SMITH

FOUNDER OF THE NORTH LONDON RIFLE CLUB, ORIGINATOR OF  
MILITARY CYCLING, ETC., ETC., ETC.



REVISED EDITION.

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## P R E F A C E.

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THE first compilation of this book appeared in the columns of the *Volunteer Service Gazette* as articles on "Snider Target Shooting," and I was led to publish them in book form by the letters I received during the original periodical appearance of the articles, suggesting that this course should be taken, and in the hope that, being in a more portable form, the information conveyed might be of use at the ranges, and serve as a sort of pocket guide.

The book, after its several revisions, is very much like the Irishman's old knife, with its new blades, its new handle, and new everything; but to its partial owner it remains the same old knife (better than any other knife); and so I think that this manual as revised can still take a front rank as a useful Book of Instruction in Rifle Shooting.

Many such books have most elaborate and

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complicated tables of all kinds, with minute measurements even at extreme distances. Some of them would necessitate a slate and pencil and other implements before firing each shot. I do not believe in this, but my aim, as in earlier editions, is to put the salient features forward as plainly and as simply as is possible in words.

HENRY SMITH.

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# THE RIFLE SHOT'S MANUAL.

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## INTRODUCTION.

IN the following pages it will be attempted, and it is hoped with success, to give the readers of this book concise and yet comprehensive information upon the details of Rifle Shooting and its accessories; and although it is a simple matter of course that much that it is possible to say now upon this interesting subject is already known to those expert shots who have, by careful practice, laid down home-made rules for their individual guidance, all that will here be quoted can be accepted as the *bonâ fide* experience of a not unsuccessful shot, who has found a great pleasure during the many years he has had of Volunteer prize-shooting, in noting down a careful record of the results he has obtained; and from this record, and other dependable data, the several suggestions, hints, and information contained in this volume have been sifted. It is not thought

that anything which can be put together will enable those who have already made themselves a name in the shooting world to shoot better, although it may be that even they will find something which will either enlighten them on points upon which they are now doubtful, or make clear to them matters which they have only hitherto suspected or taken for granted, more especially as relating to the small-bore; but it is those who have a strong desire to emulate their more skilful and successful fellows, and to become in their turn good "shots," and thus acquire some distinction, that it is now proposed to address and to instruct. There are very many men who have, in spite of earnest endeavours, hitherto been baffled in their attempts to secure uniformly good results when they have been at the ranges; one day making a fair score, and perhaps on the succeeding occasion going to "utter and irretrievable grief," but who cannot for their life understand why this should be so; and it is more especially these and the tyros in shooting who, it is hoped, will derive benefit from the information which will be found in these pages. These men find it difficult and even impossible to ascertain why they fail at one time, while at another they do so well; but the true cause is not difficult to find: it is that they do not possess the requisite knowledge of the minutiae of shooting to enable them to decide on the spur of the moment what they should do on this particular day, and under the particular circumstances in which they find themselves, but argue within themselves that

they got on very well when they did so-and-so, and therefore think they cannot be far out if they do precisely the same again. Or they pass from one to another saying, "What is the sighting?" "Where is the aim?" and other questions so well known at rifle ranges, but which, I am sorry to say, do not always receive a truthful answer, especially at a prize competition, where it is "*chacun pour soi*." It is, then, to such men that I desire to be of assistance. And, further, it is also hoped that the perusal of these pages will be the means of bringing forward many who now, if they think of rifle shooting at all, consider that they have no chance with Sergeant So-and-so or Private Such-a-one—the crack shots of their particular corps—and who take it as a simple matter of course that *they* will "do no good," and therefore never attend the ranges at all,—while perhaps the real fact of the matter is that they have within them the true elements which would bring them to the immediate front in the shooting world could they but pass the trying ordeal of the first step, and thus secure a certain amount of confidence. This it is difficult to do unaided.

No doubt there are many men who have a natural gift and aptitude for rifle shooting, and as they also possess the *penchant* for it, they succeed and fall into the ranks of the "shots" in their earliest essays; but such men are the exception and not the rule, and where there is one man who does this unaided, there are scores who would be successful with a moderate amount of instruction.

Numbers of the great shots among the Volunteers have *acquired* their skill, and have not, as the saying is, been born to it, but have mastered detail after detail until they know every in and every out of the art of rifle shooting, and consequently know exactly how to act under any circumstances whatever. This has only been arrived at after a vast amount of assiduous practice and close observation, and it is my hope that I shall smooth the way for my readers, and enable them to gather at the outset much that would otherwise take them some considerable time to acquire of themselves.

The skill now possessed by hundreds of our crack shots is simply wonderful, and has certainly never before been equalled in this or any other country. It is true that in Cooper's well-known tales we have read of wondrous feats of skill with the rifle, but it is obvious to any one who knows aught of rifle shooting that they never can have occurred as narrated, as it is (and always has been) a matter of sheer impossibility to drive ball after ball into the same hole "at 200 paces," or to shoot through two potatoes in the air at the moment they are in a straight line, or to hit a flying bird through the eye when it appears a mere speck in the air, or even to strike a crow on a wall at 800 yards with an Enfield rifle, as one popular author makes his hero do during the Indian Mutiny ; but the way in which some of the Volunteer competitors at Bisley actually do succeed in putting shot after shot into the bull's-eye with the regulation military breechloaders, not to mention the



amazing performance possible with the match small-bore, is undoubtedly truly marvellous.

Their ability to do this is due to the fact that they know their art thoroughly ; they know their rifle, their elevation, the necessary windage to allow, and they know how to hold their rifle as in a vice, and, what is equally or even more important, how to arrive beforehand at such a state of things as to enable them to do so when the proper moment arrives.

No one must, then, suppose that he will ever be able to do the deeds with his rifle of which he has read in novels, because it is physically impracticable ; but it is nevertheless quite possible to secure good results and make brilliant scores at the targets without such minute accuracy as would be needed to fire through two potatoes in the air, or to hit a crow sitting on a wall 800 yards away, which, as I have already intimated, is simply impossible.

I will now proceed to my task, and speak first of the rifle itself.

The Martini-Henry is still in use in some portions of the British Empire, hence it has also been kept under notice.

## THE RIFLE.

The first and most important step towards good and successful shooting is, of course, to become possessed of a good rifle—*e.g.* one which can be depended upon to throw its shots, when accurately aimed, within a radius of one or two feet at 600 yards, which is all that can be expected, but which is still sufficiently accurate; but the more recently introduced military smallbores may be expected to shoot even closer than this, and to maintain the minimum of deviation at the longer ranges. This is largely due to the superior grooving, but much is attributable to the more carefully made ammunition.

## RACK RIFLES.

As a rule, the Lee-Enfields, Lee-Metfords and also the Martinis served out from the armouries, and made by the Government in its private factories at Enfield and elsewhere, called "Rack rifles," are as near perfection as it is possible to arrive with a rifle of this class; and so they ought to be, as they are the result of a most elaborate system of machinery, and are only issued after a most careful examination and close scrutiny at the hands of specially trained Government inspectors, who reject any in which

there is the slightest defect. The grooving is perfect, and every detail has to be in strict accord with regulation gauges, so that it must be almost impossible for a faulty barrel to pass undetected. It is very seldom that these rifles turn out badly, and large numbers of the best shots, knowing this, stick most religiously to the Rack rifles, or return to them after a short dalliance with one of private make, perhaps a steel barrel, which they have been tempted to purchase.

With the .303 Lee-Enfield these remarks apply with even greater force, as any one who has been over the Government factories where these splendid rifles are being made, and observed the processes through which each part passes, will at once understand how difficult it must be for any fault in the manufacture to escape unnoticed.

The great disadvantage of depending solely upon a Rack rifle is that, when they are periodically sent in to the armouries and returned to the Government factories for inspection or rebrowning, one has the certitude that his dearly-prized rifle is in the hands of unsympathetic and perhaps rough-handling strangers—and what pain is more acute to a shooting man than to see his beloved rifle being roughly handled? There is no doubt, however, that every care is taken of the rifles, and as the numbers on the breech and the stock must correspond, there is little fear of any change of barrel taking place, so that in reality there is no need whatever for any inquietude on this head.

## PRIVATE RIFLES.

It has been stated that, as a rule Rack rifles are as good as any that can be obtained ; but it is of course quite possible to procure rifles of private make equal to those supplied by the Government, more especially if the purchase be made of one of the firms who have devoted their attention especially to military small arms. The best of these firms may safely be depended upon to supply a good weapon, for their credit depends upon it, and their vast experience in the manufacture has brought them to produce rifles in the highest perfection.

IRON *v.* STEEL BARRELS.

There has always been considerable difference of opinion as to the respective merits of steel and iron barrels ; but while it is possible that a good barrel of either material cannot be much affected or prejudiced by the particular metal of which it is composed, practical experience has shown that steel barrels are not, for some inscrutable reason, so reliable as those made of the softer metal, *i.e.* they do not perform so uniformly well, and you cannot depend upon getting a perfect barrel made of steel so certainly as you can if you order one made of iron ; and, as a matter of fact, many of the best shots returned to iron barrels after a trial of the steel barrels in years gone by.

The reason for this may be that the manufacture of steel barrels is so much more difficult that it is not easy to turn them out perfect, or, if perfect when turned out, they are liable to "chip" in use; whereas the softer metal of which iron barrels are composed is more pliable, and more facile of manipulation, and the consequence is that better and more perfect barrels can be made of iron than steel.

Then, too, in hot weather, steel heats so much more rapidly, being more sensitive, than iron, that after a few shots on a hot day the barrel is so hot as to be unbearable, and this excessive heat hardens the fouling, especially with black powder—a serious drawback to good shooting. Further, there is the fact that a steel barrel is more elastic, as it were, so that there is a more appreciable amount of jar when the discharge takes place; and although this is, of course, of the most minute character, yet there can be no doubt that the least thing makes some difference in the mean deviation of a rifle at long ranges. Certainly there are good steel barrels, but it is safer when ordering a new one to have an iron barrel than one of steel, for the reasons given.

After all, the only advantage a steel barrel has over an iron barrel of equal merit, is in its supposed better wearing capabilities; but it will be found that an iron barrel will last as long as it is required, and at the worst it only amounts to purchasing another if it should be found to fail *systematically* after years of usage.

While upon the subject of the barrels of rifles, it

may serve a useful purpose to give here an extract from a letter received from an eminent rifle and gun maker, who has secured distinction in both branches, having won a widely contested prize for perfection and accuracy of boring; and it will be seen that his opinion and practical experience fully bear out all that has been said upon the subject of the great superiority of iron over steel for barrels. He says: "I have had many years' experience in the manufacture of military rifles, and have supplied a large quantity to Volunteers direct, and through merchants and gunmakers. These were nearly all with steel barrels, there being a great rage for them just then. From some of my customers, first-rate shots, I had complaints of the uncertainty of shooting of steel barrels, and I therefore made a few iron ones, which gave great satisfaction, being found more reliable than the steel ones in the same hands. From that time I have had a large demand for iron barrels, and they have given immense satisfaction. I may mention that I tried steel in a muzzle-loading Enfield, and *had a splendid barrel*, but *occasionally I got an unaccountably bad shot*. This never once occurred with my iron barrel."

This is exactly the writer's own experience of the steel barrel in years gone by.

The objection to steel does not perhaps apply so forcibly to the stouter barrels of smallbore military rifles.

## SHALLOW GROOVES.

Some rifle barrels have deeper grooves than others, and there is, again, a difference of opinion as to which are the best. It is always found, however, that the shallow grooves answer well; and they are certainly not so liable to strip the bullets or to become foul, and in choosing a barrel it is well to bear this in mind. The deep-grooved barrels sometimes take a good deal of wear before they are dependable, but this is not the case with shallow grooves, which are in their prime at once.

Theoretically, as in the case of steel against iron, they may not be expected to last for so many years, but practically the shallow-grooved barrels last as long as the deeper-grooved ones, as it needs many a thousand bullets to make any impression upon even the softer material of which iron barrels are made.

One great cause of the wearing out of rifle barrels, especially near the muzzle, is the use of the iron cleaning rod. This should never be used, but the cleaning out should be either with a wooden cleaning rod, or, which is still better, with a properly constructed "cleaner," dragged through the barrel from breech to muzzle with a piece of string.

## THE BALANCE.

In selecting a rifle, whether in the armoury or in a shop, care should be taken that it balances well, as nearly as possible just under the breech end of the backsight, so that when it is grasped at that point by the left hand in aiming there is no tendency to topheaviness. An even balance is a desideratum, and affords great assistance in holding the rifle steadily in position, both when standing and when lying down upon the stomach, but more especially when standing, as there is, of course, in that position less support for the arms and body.

The present .303 rifle is splendidly balanced for shooting purposes.

## THE STOCK OR BUTT.

Another point in connection with the exterior portion of a rifle to which considerable importance should be attached is the form of the woodwork both at the points where the weapon is grasped and that in which the barrel is laid. The woodwork all through is best when fairly stout; a good handful below the lower band is easier to hold than when more attenuated and slighter, and the rounder this portion is the more comfortably and steadily it rests in the hand. This is well provided for in the modern .303 rifles.



As regards the portion in which the barrel is fixed. Some rifles have, as it were, a mere shaving of wood in sight, at either side of the barrel, while others show a good surface there. The latter is much to be preferred, as, without mentioning additional strength, the side surfaces give very considerable assistance in posing the rifle and sights in an exactly perpendicular position when taking aim, it being much easier to guide the eye to the true angle with such assistance than when there is merely the top of the barrel and bands to judge by, and, as we know, every little helps in shooting.

Care should be taken when buying a private rifle, that "the small" of the butt is not too slender, and that there is plenty of room for the thumb to rest, *pointing straight to the front*, behind the block when at full cock. A good broad flat space behind, upon which to rest the thumb when aiming, so as to enable the trigger to be *squeezed* with the whole power of the hand, and not *pulled*, greatly facilitates a steady discharge; and it is because the regulation pattern allows this space to be of various forms that such a point is made of the desirability of this being as flat and as broad as possible, in preference to being more rounded off at that particular place.

In the Martini this is met by a specially prepared thumbpiece, and with the modern .303 the thumb can be pressed upon the bolt lever with distinct advantage.

## THE SIGHTS.

When selecting a rifle, specially careful attention should also be given to the arrangement of the sights, and no pains should be spared to secure one in which both fore and back sights are in perfect position.

The tip of the foresight should be exactly in the centre of the block, the block in the exact centre of the barrel, and the centre of the backsight at all points should in like manner be accurately aligned with the tip of the foresight, directly along the straight line described by the axis of the bore.

A "stumpy" foresight is better than one which shoots up like a tenpenny nail, as there is not so much danger of losing the elevation, and it is easier to secure the same amount of sight every time and in all lights.

In the Lee-Enfield, the foresight is purposely placed a little on one side. This is supposed to counteract the acute sideways spin of the bullet due to the sharp rifling. I, however, cannot help thinking that this is a mistake, as the same allowance from the centre cannot possibly apply correctly at all distances.

## PULL OF TRIGGER.

The regulations vary properly, with a view to safety when large numbers of men are massed together with rifles in their hands, limit the minimum pull of the trigger of military rifles to 6 lbs.; and as

disqualification, short, sharp, and decisive, is the inevitable consequence of the infraction of this rule when detected at prize meetings, it is of course very important that the trigger should "pull" the required amount. It is sometimes found, when the line is drawn too fine—for instance, if the pull is kept at about  $6\frac{1}{4}$  lbs.—that while at one trial the weight can be lifted from the ground, an hour or two afterwards the trigger will not move the weight at all; and therefore it is better to keep well away from the minimum allowance. The most serviceable and reliable pull is one of about 7 lbs. This gives a good margin for variations (caused perhaps by the temperature), and is not too strong a pull when the firer is accustomed to it—as every man should be to the pull of his rifle. Whatever be the strength of pull adopted, that strength should always be adhered to and maintained, as it is essential when shooting that the firer should have what one may term an intuitive knowledge of the exact point of pressure at which his hammer will fall; and if the same strength of pull is not preserved at all times, many a shot will certainly be lost from the rifle going off too soon when the pull is lighter than usual, or by jerking up the muzzle, called "bobbing," when it is stronger than that to which the finger and mind have become habituated.

The pull should never be allowed to become too heavy and difficult to manage, as this is a frequent source of trouble, and entails many misses, but the strength should be kept as near as possible to 7 lbs.,

taking care, however, while securing this, rather to have  $6\frac{3}{4}$  than  $7\frac{1}{4}$  lbs.

If the pull is too heavy or too light, the rifle should at once be taken to the armourer, if a practical man, or a gunmaker, as although the alteration of a trigger-pull is an easy matter, the importance of having an easy, regular pull off renders it highly desirable that this point should be adjusted by a practised mechanic using proper means, and who would know exactly what to do, and how much difference to make, to remedy the difficulty experienced.

### STRAIGHT BAR OR V.

Since the optional use of the straight side of the sliding-bar instead of the V has been allowed by the War Department in the Army, and by the National Rifle Association, and consequently at all prize competitions, there has been much diversity of practice in the application of the two systems; and although some of the best shots continue to use the V, probably finding that they get on very well with it, or perhaps being too conservative to change, a very large number of shooting men use the straight side in preference to the V, and I am certainly of opinion that this mode of using the slider is decidedly the most judicious course to adopt.

The V sight answers very well for men of keen sight when the aim is dead on, or even when the point of aim is on any part of the target itself; but

when the strength of the wind renders it necessary to aim *off* the target, more especially when it is 6 or 8 feet away from its edge upon the dark background of the butt—when it is almost, if not quite, a matter of impossibility to preserve either the proper elevation or to give the proper allowance through the notch of the V; and when aiming more than a certain distance away from the bull's-eye as the sides of the V then entirely cover the “eye,” and sometimes even the whole target, from sight, it is, under such circumstances, almost at haphazard that the aim is taken. The result of such a state of things is that men using the V come, as a rule, to grief; indeed, this is almost inevitable, unless it so happens that they are able to fix upon some salient feature on the groundwork of the butt which happens to be the proper point of aim, and at which they can take their sight. With this assistance they are of course able to hold their own, but it is not always possible to secure such a convenient salient feature to aim at.

However, any one desiring to use the V should always, when aiming off the target, try to select some spot at which to take aim. It does not matter what it is, so long as it is in the right place and can be discerned through the sights; it may be a bush, a plank of wood, a dab of whitening, or even a darker patch on the butt, but, whatever it is, it must of necessity be better to aim at than “the wide, wide world,” which is equal to nothing at all.

The advantages possessed by the straight bar as

against the V are, however, in my own opinion, very marked and incontrovertible. Even if the bar be not used as a wind-gauge, it is infinitely more easy to aim over the centre line of the straight bar and preserve the elevation and allowance, when aiming off the target, than with the V, as, unless the aim is a very considerable distance off the target, the bull's-eye, or at any rate some portion of the target, always remains in sight to control the allowance, and the straight edge of the bar is an effective guide in preserving the elevation; and therefore, although with the straight bar it is also always well to have some point of aim when off the target, the consequences of the absence of such assistance are not so fatal as when the V is used.

### THE WIND-GAUGE.

The greatest superiority of the straight bar over the V, however, consists in the fact that it may be used as a wind-gauge, either with or without one of the Ventometers now sold; so that it is but rarely that the actual point of aim need be removed from the bull's-eye itself, or, when the wind is too strong for this, from some part of the white target. This is of course arranged by aiming over the bar at different points away from the centre line; to the left of it if allowing for a left wind, and *vice versâ*. It is true that it is only possible to allow for a limited amount of wind ~~the~~ inside the uprights, and therefore, if the wind be stronger ~~that~~ this amount of allowance will

counteract, the bull's-eye must be left and the aim removed elsewhere; but this possible allowance is usually found to be sufficient, and then there is a decided advantage in being able to aim "dead on," or thereabout, rather than at the edge of the target, or, what is infinitely worse, the very indefinite "foot off the edge" of the target, or even a "foot" off the bull's-eye.

Then, also, when men using the V are aiming some feet off the edge at, perhaps, an indefinite object, when allowing for wind upon the straight bar it is seldom necessary to do more than aim at the edge of the target.

A very considerable increase in the allowance for wind may be secured by aiming *outside* the uprights; but this is somewhat risky, and should be carefully worked out in practice by each man himself, before adopting this branch of the system in a prize competition. The plan would very rarely be applicable.

With the present .303 military rifles, a considerable allowance can be made if the aim be taken in either corner of the upright. For instance, when shooting at 800 yards, aiming "dead on" the "bull" over either of the two *side* lines, when three platinum lines are on the slides, represents an allowance for about 10 feet of wind when a moderately strong wind is blowing.

A great advantage connected with the use of the straight bar as a wind-gauge is that the same allowance—or nearly the same, a trifle more if anything, according as the more distant firing-point and the

intervening space are more or less exposed—serves with the same amount of wind at all distances with some rifles. For instance, if the aim is half-way between the centre line and the upright at 500 yards, the same aim will be found approximately correct for 600, 700, and 800 yards, as the farther the firing point is removed from the target the greater is the amount of divergence of the muzzle from the bull's-eye when aiming over a given point on the bar. This increased divergence is, as nearly as possible, an equivalent for the increased allowance for wind required at each succeeding distance ; and the line of sight taken half-way between the centre and the upright, and diverging the line of fire, *i.e.* the axis of the bore, to a point two or three feet away from the centre of the bull's-eye at 500 yards would, with each successive yard, diverge the muzzle further and further from the bull's-eye, until, at 600 yards, it would be pointing at a spot three or four feet away from the bull's-eye, or about the same amount of increased allowance as is needed to counteract the additional hundred yards of wind which the bullet has to contend with.

With the Martini, and other rifles with short barrels, the divergence of the muzzle increases in a greater ratio, and a slightly decreased allowance is required for distances *over* 600 yards, as compared with that required for 500 and 600 yards for the same strength of wind.

Furthermore, the tip of the foresight can be more clearly defined when appearing over the edge of the



straight bar, and the troublesome blur experienced by some men when using the V is not so observable.

### PLATINUM-LINED SLIDERS.

Platinum lines are formally allowed and in many cases three are used, one central and two midway between the centre and the upright; and as they can as a rule be more easily preserved and perceived, when aiming, than a simple scratch or cut in the metal, it is as well to have a sliding-bar so fitted; but the line or lines should not be too coarse—on the contrary, it, or they, should be as fine as possible.

Many men, now that both black and white are allowed on the sights, put a small speck of white on the slider at the point over which the aim is to be taken to counteract the wind. This dispenses in a great measure with the use of the platinum lines at all, although they still serve a useful purpose in aiding to preserve the uprightness of the sights, especially when shooting from the back.

A great improvement could easily be made in the sight of military rifles if it were permitted to file the bar to a knife edge; and probably this will sooner or later be allowed, when I should advise every one to have his bar sharpened at once, whether he uses the straight side of the bar or the V.

The slider should not fit too loosely on the flange, as if it does it is liable to slip down when the rifle is fired, and the succeeding shot, if the fact passes

unperceived—as it probably would—would most likely be a low shot or ricochet, or even miss the target altogether.

### LENGTH OF THE STOCK OR BUTT.

The length of the stock proper for each man depends very much, as a matter of course, upon the reaching capacity of his arm and the length of his neck, and it is well to take care, in selecting a rifle, that there is some sort of “fit,” just in the same way as is done by game shots in selecting their fowling-pieces. The need for a strictly accurate fit, whether as regards the length or the bend of the stock, in the case of a military match rifle for target shooting is, however, perhaps not so marked as it is with sporting guns, seeing that, while the latter must of necessity be so shaped as, so to speak, to *drop* into the proper position at “the present” the instant it is needed to discharge the gun at the appearance of the game, as there is usually no time for preliminary adjustment, the rifleman firing at a fixed object has plenty of time to pull himself together and fix his rifle into its proper position before taking his final aim. It is, however, of no small importance that the length of a rifle stock should be suitable to the length of the arm, although experience will get over any inequality.

The stock should be such as to enable the firer, while having the butt firmly pressed fair into the

centre of the shoulder, to pass the second joint of the index finger of the right hand well round the trigger, so as to secure a powerful pull-off. A stock too long renders this difficult of accomplishment, while a stock too short is inconvenient, especially when lying down at the 200 yards range, seeing that it necessitates the cheek being carried forward and laid so low down on the stock as to bring the face within the radius of the recoil of the rifle, and thus the firer receives a severe blow on the cheek at every discharge—a matter which has, of course, an unfavourable effect upon the score, as no man can be steady and pull his trigger without flinching when he knows that the instant he does so he will receive a smart blow on the face.

The only way to counteract this inconvenience when shooting lying down at 200 yards is to let the body and legs bear well away to the left, and throw the head back and as near the heel of the butt as can be done while taking aim.

The several bands should be properly screwed up securely tight, and not allowed to become loose.

### TRYING THE RIFLE.

One often hears at the ranges the remark, "I am trying a new rifle"—the person saying so being found firing away shot after shot without any apparent system; and perhaps, if unsteady, finishing off with being very dissatisfied with it, he having

had the idea of basing an opinion as to the goodness or otherwise of the barrel upon the first score made with it. This is, however, not the best way to test the shooting powers of a rifle barrel, as this can only be gauged by ascertaining to a nicety what is its average deviation.

A capital method to adopt to ascertain this important point is, if the owner cannot depend upon his own steadiness, to get some known steady shot to fire ten or twenty rounds at 500 yards, and if after the proper elevation is found a good score is made, then to take it in hand himself, as he may thus, to some extent, be satisfied that the barrel is all right. The best and most certain way to try what a rifle is worth, however, is to procure a good-sized bag full of sand, and deposit this at the 500 yards firing point, to act as a rest. Then get the steady shot afore-said (or, if not available, do it yourself) to lie down behind the sand-bag, and rest the rifle upon it as though firing from a shelter trench. In this position the yielding sand in the bag will form a capital rest, and will be found to act better than the ordinary gunmakers' artificial rests, which are, so to say, too *metallic* in their grasp of the rifle. Carefully fix the rifle, and take a steady aim at a given part of the target—the left bottom segment of the bull's-eye if the wind will allow the target to be hit *in any part* with this aim—and fire. Do this until you have got, say, a dozen consecutive shots upon the target, arranging beforehand, of course, not to have each shot wiped out. The face of the target should then

be examined: and if satisfied with the steadiness and accuracy of the aim, and that the rifle has been "held" upon the same spot at each discharge, and that there has been no marked variation in the wind—if it is found that the whole of the shots have struck the target within a radius of one or two feet, the owner of the rifle may rest assured that he has got a barrel which will shoot as well as it is possible to secure.

Of course a day as calm as possible, or when the wind is gentle or steady, should be selected for this test. Some shots should then be tried from the sand-bag, aiming for a good score, and a careful record should be taken of the elevation, which would be proper to bring the shots on a line with the bull's-eye on this occasion, to form the standard of *average elevation*.

A few shots fired upon this system will value more than hundreds fired in the ordinary way, and furnish more reliable data for judging of the capabilities of the rifle.

## ACCESSORIES.

All riflemen should use the "Vernier," or Screw-sight Elevator, which is a most useful little instrument, as by its means the slide of the backsight can be adjusted with the nicest accuracy to the 200th part of an inch, and a record in simple figures can be taken of the elevation used on every given day's

shooting. A description of the application of the "Vernier" will follow later on.

The other necessary articles are a *wooden* cleaning-rod, a sight-protector, and a register-book ; a shooting bed is also useful, but care should be taken that it is of uniform thickness throughout, as there is the chance of being disqualified, or what is as bad to some men just before shooting, challenged, if there is anything that a lynx-eyed range officer can fix upon as an elbow rest. A gun-cover in which to stow the rifle when put by is always desirable, but if this is made of india-rubber or any other waterproof substance which does not allow of evaporation, the rifle should never be placed within it after firing on a wet day and while it is still wet, as, if so, moisture is conveyed into the interior and of course is left there to act upon the rifle in the shape of rust, when it is put back again after being cleaned and oiled for the day.

A binocular field-glass or telescope is also a useful adjunct ; indeed, it is almost an essential with the Bland's patch system of secondary marking on the penetrable targets. It should be sufficiently powerful to discern through it the patches at 600 and 1000 yards.

When at the ranges the "pull through" or a "cleaner" to drag through the barrel is more handy than the cleaning-rod, and is more easily carried about. It may either be purchased in an elaborate form, with a brush and a piece of cloth attached, or it can be home-made. The latter is cheaper, and

perhaps quite as good. All that is needed is a piece of oblong cloth, oiled and folded, with a string, sufficiently strong, looping it in the centre. A piece of lead is attached to the other end of the string, to drop down the barrel from the breech end, and the whole can then be pulled through the barrel, cleaning it in its passage sufficiently well in one operation to continue the shooting, or even to put by for a moderate time. To prevent soiling the pocket these cleaners should be carried in a box, or in an ordinary india-rubber tobacco pouch kept for the purpose.

The best oil to use for cleaning and preserving the rifle from rust is refined olein, which, if pure, never dries, and is therefore a certain preventive of rust ; and I would strongly recommend a specially purified lard oil, which I have used myself for some years with great satisfaction.

### DISTEMPERING THE SIGHTS.

Burning camphor makes a very deep black if the sights are held just over the flame, but chemically prepared sight-black is less liable to rub off should the sights be accidentally touched. An ordinary wax match will also serve as a capital means of blackening the sights when no camphor or sight-black is available.

Both foresight and backsight should always be distempered before shooting, whether there is sunshine or not, but more especially when there is, "as

it is impossible to depend upon the aim taken with the sights glittering in the sun ; and when there is a glare from the front, the bands and the top of the barrel should also be blackened, to prevent any reflection of the sunbeams from dazzling the eye when aiming. Care should be taken that the sights are perfectly clean and free from any foreign particles before applying the tempering matter, whatever it may be, and that there is no dirt at the bottom of the V sights ; and it is also well to see that the inside of the flange of the upright backsight is also free from dirt, or the small portions of thread or tow which are liable to be detached from the rag or tow used in oiling.

If the straight bar is used it will be sufficient to dull its upper edge, leaving the centre line clear in sight down the remainder of the bar, more especially if the lines are inlaid with platinum, as many now are. If, however, the centre line is only scratched or cut into the slider, the whole of the bar should be blackened and the point of a knife should be carefully drawn (with some pressure, to show it up distinctly and renew the first brightness of the scratch) down the original scratched line, starting about the sixteenth of an inch from the top edge of the bar, or a speck of white deposited on the proper point of aim.

In every case the whole of the upper *edge of the bar*, including the central line, should be distempered ; as, if the bright centre line is carried to the extreme top of the bar, the point where it touches the edge gleams



in the light like a little star, and is therefore highly inconvenient.

The writer has seen some men, who were using the V and allowing for wind by aiming off the target on the butt, rub the extreme tip of the foresight so as to show a bright white speck through the black. This seems to be a logical course, as it must be easier to discern a bright white speck when aligned on the blackness of the butt, than the black tip of the foresight, which is the same colour as the dark mound, and therefore not readily distinguishable from it. This, is, however, needless if white paint be used.

### CLEANING OUT AND FOULING.

The rifle should always be cleaned out, either with the "cleaner" or the cleaning-rod fitted with *unoiled* tow, between ranges, or after, say, every ten shots.

There is no doubt that after a certain point, when a number of rounds have been fired, the fouling which has formed prejudicially affects the shooting, especially upon a hot day, when the heat of the barrel tends to harden it, or when the wind is in the E. or N.E.; and too much reliance should not, therefore, be placed upon statements which are sometimes made to the effect that it is not necessary to clean out as there is no more fouling after the twentieth shot than there is after the first. It may be true that each succeeding bullet clears a way through the

fouling caused by the preceding shot—and of course this is so—but at the same time it is quite possible that layer upon layer of fouling, albeit smoothed over to some extent by the passing bullets, gradually with each successive shot gets harder and harder, fills effectually the “corners” of the grooves, and is generally more appreciable, so that it soon offers a positive hindrance to the bullet's course through the grooves, and this to such an extent as to be liable to impair its truth or even to cause it to strip, or, as the edges of the grooves become clogged, to lose to some extent the benefit of the rifling.

It is better to have a clean barrel—though not too oily—where it is possible, especially to start with at a fresh range; and therefore the advice here given is to clean out before commencing any competition, and also when moving from one range to another; but it is very desirable to “blow off” before commencing, if it be possible.

The new Lee-Metford and Lee-Enfield with cordite are not so much affected by fouling as are some rifles, and in very damp weather there is, perhaps, not such an urgent need for much wiping out; but in an ordinary atmosphere and on a very dry day the necessity for frequent wiping out is very marked, because of the little fragments of residue which are deposited in the barrel after each discharge.

To prevent the fouling drying too much, for instance, when firing seven or ten shots (or even less on a warm, dry day), it is a capital plan to leave the old cartridge-case in the breech until the moment

has come for reloading for the next shot. This prevents the passage of wind through the barrel, and consequently keeps the fouling very much damper and less liable to harden.

When the air is very dry it has a good effect to blow down the barrel from the muzzle, adding as much moisture in the act as possible. This tends to moisten the gritty particles of fouling—at any rate just at the muzzle, the most important point.

### AMOUNT OF SIGHT.

The sight which can be taken with the military rifle with the “barley-corn” foresight may be classified under four heads—the fine, the medium, and the full sight, and sighting with the whole of the block.

### FINE SIGHT.

The first of these, although it may be that under certain given conditions very close shooting can be secured, cannot be recommended for general usage. When there is a clear, bright, vivid light, with a leaden-grey sky, it is possible to take the merest tip of the foresight, and very good shooting can, of course, be made; but sometimes, if it is attempted to take a fine sight, it is found impossible to do so, and while the firer may think that he has only the usual amount of sight in view, the real fact may be that

he has very considerably more, and, as a consequence, is very much astray in his elevation.

It is not well, then, to adopt the fine sight.

### FULL SIGHT.

The full sight, *i.e.* the whole of the sight above the block, is a very useful sight, especially for those whose vision is not keen, but it is somewhat coarse; and although many men undoubtedly do well with this sight, it is not always easy to avoid taking a little of the block as well, which, if unnoticed, as may easily be the case in some lights, somewhat damages the score.

This is, however, entirely obviated by painting the square block white and the whole of the barley-corn tip black, with a white line up the centre. Mr. Andrews of Woolwich sells a special little appliance for thus marking the foresight.

### MEDIUM SIGHT.

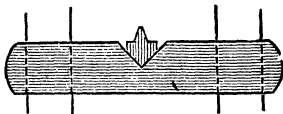
A useful sight to take, more particularly with the straight bar, and, indeed, the  $\nabla$  also, is a well-defined medium sight, not too fine and not too full, but such as to leave a clear margin, so as to avoid the block and to keep plenty of the foresight in view.

The actual aim should of course be taken with the extreme tip of the foresight.

## THE WHOLE OF THE BLOCK.

A very useful sight for those whose vision is not particularly keen is that secured by taking the whole of the block, as this is more easily seen, and there is less blur observable.

The following diagram will show the mode of taking the whole of the block, which, by the way can only be done to advantage with the V.



The shoulders of the block should be brought up in sight within the notch of the V until the straight line they describe is in a direct line with the top edge of the bar, and the elevation is thus maintained.

The aim should be taken from the *tip* of the foresight, as in all other modes of taking sight.

On a dark, dull day there is no doubt that the elevation can be better maintained, by men whose sight is not acute, by preserving the shoulders of the block in line with the top of the bar than under any other arrangement, and in such cases, no doubt, this sight is to be commended.

To use this sight the elevation should be lowered to an extent corresponding with the actual depth of

the V, generally from six to eight degrees on the Vernier.

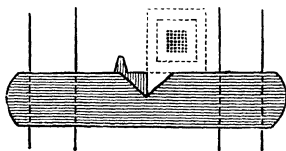
When making use of this class of sight there is a slight difficulty in preserving the "direction," owing to the extreme care required to insure that the block and foresight are in the exact centre of the V. This can only be overcome by practice, and therefore those who find the fine, full, or medium sights unsuitable to their vision, and desiring to use the whole block, should take care to carefully practise the system before making use of it in a competition.

A still better mode of applying the whole of the block is the following, being the system adopted by one of our most celebrated Yorkshire shots. He thus describes his system in a letter to the *Volunteer Service Gazette*, while commenting on my suggestion as to using the "whole of the block":—

"In shooting with the 'whole of the block,' I do not use the *tip* of the foresight, but on the contrary I use the *edge* of the block, right or left edge according to the direction of wind, aligning it so as to intersect very accurately the *centre* of the V of the backsight. The upper edge or shoulders of the block are brought up in line with the top edge of the sliding-bar as stated, but in taking aim the *corner of the block* should be aligned with the *lower edge* of the target, under the bull's-eye, under the right or left centre line, under the right or left edge of the target, or further away, as the strength of the wind may require.

"For example, with a *left* wind, which would

require an allowance *off* the left edge of the target when the tip of the foresight and centre of the V are used, the sights should be seen as follows when using the block :—Place the *right* edge of the block intersecting the V of the backsight perpendicularly, and in line with the *left* edge of the target, and bring up the upper edge of the block until it is in line with the upper edge of the sliding bar horizontally, and in line with the *lower edge* of the target, aiming with the top corner of the block at the *left low* corner of the target. The accompanying cut will explain more clearly.



“It is not difficult to keep the *edge* of the block in the centre of the V, as shown in the diagram, but it is much more so to keep the *centre* of the foresight in the centre of the V when the block is used.

“It is as much a useful sight to those who have keen vision as to others, and there is, at any rate, as little difficulty in preserving the direction and also the elevation as accurately as in any other method, especially in a bad or falling light. I find *less* difficulty, but that may be attributed to the practice that I have had with it. The advantage of using

the lower edge of the target will soon be appreciated with practice, and instead of lowering the back-sight six or eight hundredths, about half that will suffice.

“Any qualified rifleman, with such careful recording habits as are essential for success in rifle shooting, will readily make a scale of allowances for wind from his own practice, with the right edge of the block for left wind, and the left edge of the block for right wind.”

### PRACTICE AT HOME.

Very much of the success of a rifle shot depends upon the assiduity with which he devotes himself to preparatory measures at home, whether it be in the shape of position drill, first practice, aiming and snapping, the bayonet exercise, or whatever other means he may find to habituate himself to the “feel” and general characteristics of his rifle. Handling the rifle in any manner in leisure moments renders it much easier to manipulate it and hold it firmly when before the targets, and familiarity with the particular rifle which has to be shot with is a *sine quâ non*, or, if not exactly this, it is at any rate a very marked help to good shooting.

What is especially to be commended for practice at home, however, is position drill and aiming drill.



## POSITION DRILL.

This is most valuable to a would-be prize winner, and the more of it that is gone through the steadier may be the shooting expected, whether the position be standing up or lying down.

The object of the first practice of position drill, as laid down in the Musketry Instruction Book, is to accustom the soldier to handle his rifle expertly, to strengthen the left arm so as to give him a perfect command over the rifle, and to secure other points which are essential to good shooting ; and there is no doubt that in this respect the regulations are perfectly correct, as will readily be admitted if the practice is extensively carried on. Even a short quarter of an hour, or less, morning and evening, hard at work at position drill (as described in the Rifle Exercises and Musketry Instructions under the head of First Practice), will be found of immense benefit, and this not only as affecting the actual shooting, but also the general set up of the system. It strengthens the arms and has an appreciable effect upon the whole of the muscles of the body, and is, in fact, as useful a muscular exercise as dumb-bells or Indian clubs for ordinary exercising and setting up purposes : while at the same time it brings about, in the case of the rifleman, the needed expertness with his arm, and the necessary power of muscle to hold it in position.

When performing this position drill it is well to

have the bayonet fixed, as this gives greater weight to the rifle, and makes it feel, so to speak, a mere nothing when used without the bayonet ; and an assiduous performance of position drill with fixed bayonet will, in a very short time, render the rifle itself as easy to handle as a walking-stick.

### AIMING DRILL.

It is essential to good shooting that there should be an intimate union between the applied functions of the hand and the eye, and this can only be perfectly established by a constant application to aiming and snapping. It is not intended to infer that a would-be crack shot should be always doing this, but what is meant is that it should be practised *every day* during the shooting season—more especially just before any particular match is to be shot off—so as to retain the necessary familiarity with the feel of the rifle and the pull of the trigger, and preserve the essential dexterity in handling both rifle and trigger, while at the same time glancing without flinching along the sights while the aim is being taken and during the discharge.

No doubt most shooting men have remarked that, when they have been some time without firing a shot, and have done no preparatory practice at home, they feel very awkward and have a tendency to flinch at the critical moment, and thus disturb their aim, and consequently make a bad start ; but this will

never happen if aiming drill is properly performed beforehand.

I remember to have either heard or read of one of our most celebrated shots having stated that he always aimed his rifle at a mark and snapped off at least one hundred times every day in his own room, and as I have seen excellent results in the shape of capital scores invariably follow a course of position and aiming drill, I have no hesitation in stating that the value of the practice cannot be over-estimated, and that an improvement equal to nearly twenty-five per cent. may be arrived at in the shooting of most men by this means.

Never, then, if success is hoped for, neglect position and aiming drill during the shooting season.

### BALL PRACTICE AT HOME.

While upon the subject of aiming drill, I would recommend every rifleman to purchase a series of targets drawn to scale, so that for instance he may have a 500 yards target fixed on his wall while standing 12 or 20 feet away.

In any case, whenever aiming is done at all, it should be at something as nearly resembling the real target as possible; and if targets to aim at are prepared to scale, the paper upon which they are made should not be white, but of a more dingy hue, so that the sham may not appear whiter and cleaner than the real targets do.

Morris Tube practice is to be commended.

When performing aiming drill at home, matters should be proceeded with just as though shooting upon a rifle range, and the sights should be distempered and the aim taken as carefully, and the position and all details adhered to as strictly, as though before the real targets.

### NOTE-TAKING.

This is a very important portion of the work, which should be scrupulously performed by competitors, *i.e.* to take a record of every shot that is fired.

The advice given here is—record every shot as it is fired, whether good or bad, and whether in prize competition or practice, and do this without any hurry or flurry, as there is always plenty of time to note the shot and enter it in the register-book while the next man is taking his aim and firing.

There are several very handy little scoring-books in which a concise record of the scores can be taken in columns suitably arranged ; some of them are very small and compact, and can be carried anywhere, and have, in addition to columns for the actual scores, target outlines, upon which the position of each of the shots can be marked if it is desired to do so.

The particulars which should be shown at each practice are the range, the date, the rifle, the year's

ammunition, the weather, the light, the direction and strength of the wind, the ranges, the value of each shot, the elevation, the position, and the nature of the shooting, whether in practice or in prize-shooting, and the point of aim.

This may seem a somewhat formidable array of details, but if one of the above-mentioned books is used, the spaces for the several items will be found ready prepared, and there is but little difficulty in filling them in.

Before shooting, the preliminary particulars should be noted, and the light, weather, and wind should be recorded, and this will enable the firer to fix upon the elevation he should use, which, after a little experience, will come almost naturally and unconsciously as attending, as a matter of course, certain given appearances which present themselves to the mind.

Before mentally settling the preliminary points, a careful examination should be bestowed upon the physical features in the surroundings, the appearance of the atmosphere, the degree of light, the brightness or otherwise of the targets should be scanned, and the state of the flags on the range should be most critically examined to settle the windage, and all these appearances should be summarized and entered in the proper spaces in the register-book in the manner which will be described hereafter.

In making these entries there should be a fixed system of short signs, to save the trouble of writing

at full length. To describe the *direction* of the wind, nothing can be better than the familiar clock-face system, so that on any range, no matter how it lays according to the compass, whether from east to west or north to south, a "three-o'clock wind" would be one blowing straight across the range from right to left, a "nine-o'clock wind" one blowing in the exactly opposite direction, while the intermediate winds would be called by the appropriate figures on the clock face; a front wind being twelve o'clock, and one from the rear a "six-o'clock wind."

The strength of the wind may also be designated and entered in a similarly concise manner, and the following have been found to stand as a useful system of what may be termed "codes" for recording the varying force of the winds:—

Z. For zero or zephyr, to represent a calm.

G. Gentle wind, barely moving the flags, but still a wind which requires a change of aim.

M. Moderate wind.





S. Strong wind.

V.S. Very strong.

These definitions will be found to serve in describing with sufficient minuteness the nature of the wind when making entries for future reference in the register-book.


A still more concise and more simple way would be to mark on the target diagram, by means of lines drawn with the pencil, the force and direction of the wind. Thus, in a calm (which really seldom occurs) the letter Z will still apply, as the wind would have

no definite movement which could be recorded by lines.

Gentle wind	
Moderate wind	
Strong wind	
Very strong	

These lines should be drawn *from the point from which the wind blows to the centre* of the target diagram in the note-book, and a glance at once will show for all time what was the direction and strength of wind. "The Simplex Scoring Book," published by Messrs. W. Clowes and Sons, Ltd., provides for this form of notation.

"The weather," whether fine, or rainy, or wet, or cold, or dry, etc., should be recorded, and "the light," whether dull, or clear, or cloudy, or whether bright sun in the front or the rear, whether the fouling is dry or moist, etc., should be mentioned, in their turn, so that it may at once be seen at a future time what were the exact circumstances which obtained at any particular time and necessitated a certain given elevation, which should be taken in hundredths on the Vernier, and entered in the proper space. The point of aim should also be indicated, as this item is clearly needed to complete the necessary particulars. When allowing for wind on the bar, this can be at once shown by drawing a simple line, and intersecting it to show the

centre, and mark the spot corresponding to the portion of the bar over which the top of the foresight appeared when aiming, thus,  or the bottom

line of the target diagram could be utilized in the same way, while with the "V" a cross marked on the target outline, or off the edge of it, will show the point of aim.

Thus it will be seen that at any future time the whole particulars of the practice, the weather, the light, the elevation, the point of aim, the ammunition, etc., are kept in an unmistakable form, and should the same circumstances again obtain the same course would be adopted.

An important feature in connection with note-taking consists in the fact that a pursuance of the practice *induces steadiness and care* in the delivery of each shot, as it is obvious that a man who carefully notes his shooting must thus be led to be more painstaking, and devote more mental attention to each shot, than his fellow whose simple care is to blaze away, and make a good score if he can manage it, without any method.

The careful note-taker, on the contrary, before reaching the firing point to commence his firing, has carefully jotted down the particulars of the light, wind, etc., and has, after conning the circumstances which surround him—and perhaps, as a further guide, having examined a former leaf in his book—settled the exact elevation on the Vernier he should use, and the amount of allowance it is necessary to



make for the wind, and when his turn comes to shoot he is calm and collected, and knows exactly what he means to do.

The register-book is laid on the shooting-bed or mat before him, and each shot is entered in the scoring columns as it is marked at the target, and in the mean time the shooter is kept imperturbed and steady by the concentration of his mind upon the object which is *before* him, and his score. The practice of filling up diagrams is very useful, as it not only maps out the shooting done, but compels the shooter to note where his shots go accurately, and he is thus almost forced to make the needful allowance for the following shot.

### THE VERNIER.

This, like most other really valuable inventions, is a very simple little instrument to manage when its use is once mastered. It is made in either steel or brass, and consists of a fixed scale with graduations of fractions of an inch, and a small movable flap upon which there is a ledge to catch the sliding-bar of the backsight, and upon which there is also a scale consisting of the inch further divided into equal parts. This flap is adjusted higher or lower, as required, by means of a screw.

When the little arrow on the movable flap points at a given point of the larger scale upon the instrument, that point represents the number of degrees of hundredths of an inch the sliding-bar of the back-

sight would be elevated if it were pressed down upon the ledge on the Vernier flap. Thus, if the arrow points to "20," which is the second line on the large scale, the elevation would be  $20^{\circ}$ , and if the slide is screwed one step until the first mark from the arrow on the small slide is in a line with the third mark on the large one,  $21^{\circ}$  are given; if again screwed until the second line from the arrow is level with the fourth mark on the large scale,  $22^{\circ}$  are shown, and so on.

There is a considerable difference between the elevation on different makes of Verniers, and as there are many causes which affect the normal elevation of different rifles, it should not be assumed that a rifle which requires less than the average elevation has a lower trajectory, or *vice versâ*. The variations are mainly due to the difference, not only in the scale used, but also in the construction of the sights; a tall foresight requiring a higher altitude in the slider of the backsight to that needed for a stumpy foresight, and so on; so that there may be a difference in the amount of elevation of  $3^{\circ}$  or  $4^{\circ}$  between two rifles, and yet both may shoot exactly the same and with an equal amount of trajectory.

The elevation proper for the rifle under normal conditions should, in the first instance, be ascertained for 500 yards (perhaps during the initial trial of the rifle from the sand-bag); and when this is done, some shots should *at once*, under like conditions, be straightway fired at 600 yards to ascertain the exact difference of elevation between the two distances.

The increase of the elevation required between these ranges varies with different rifles, with the Martini from  $11^{\circ}$  to  $14^{\circ}$ , and with the Service '303 from  $9^{\circ}$  to  $11^{\circ}$ ; and the smaller this increased elevation is, the lower, it may be presumed, is the trajectory, and, adjunctly, the better the rifle.

### NORMAL ELEVATION FOR LEE-ENFIELD.

The following table shows the degrees of graduation for the several distances, representing something like the average when using the straight bar:—

From 500 to 600 yards rise from $9^{\circ}$ to $11^{\circ}$					
600	„	700	„	„	$10^{\circ}$ „ $12^{\circ}$
700	„	800	„	„	$11^{\circ}$ „ $13^{\circ}$
800	„	900	„	„	$12^{\circ}$ „ $14^{\circ}$
900	„	1000	„	„	$13^{\circ}$ „ $15^{\circ}$
And so on.					

A match slider is recommended.

### ELEVATION FOR MARTINI-HENRY.

The following is about the average for the Regulation Martini-Henry with Government ammunition, taken upon the Vernier specially prepared for the Martini sights. V and straight bar are the same on the Martini, the slider being so adjusted as to bring both sides alike:—

500 yards	...	...	...	...	$16^{\circ}$ to $21^{\circ}$
600	„	...	...	...	$28^{\circ}$ „ $33^{\circ}$
700	„	...	...	...	$42^{\circ}$ „ $46^{\circ}$
800	„	...	...	...	$59^{\circ}$ „ $64^{\circ}$
900	„	...	...	...	$74^{\circ}$ „ $78^{\circ}$
1000	„	...	...	...	$91^{\circ}$ „ $96^{\circ}$

The *exact* elevation must, however, be accurately ascertained by each man with his own rifle, and when this is once done the advantage of using the Vernier becomes readily understood, especially when shooting in the Prince of Wales's, or the second stage Queen's, or when classing or shooting for local prizes, when the competition is carried on at progressive ranges, as the proper elevation once secured at 500 or 800 yards, it is at once known to what the elevation should be increased when withdrawing to 600 or 900 yards to continue the shooting.

### APPLYING THE VERNIER.

The Vernier is especially handy when it is needed to raise or lower the sight during the shooting at a range, as this can be done with much greater nicety than with the thumb. For instance, if shooting at, say, 500 yards with  $9^{\circ}$ , and the first shot strikes low on the target, all that is needed is to screw the Vernier to  $10^{\circ}$  or  $12^{\circ}$ , as the case may require, and the defective elevation is at once rectified.

Raising or lowering the sight the hundredth of an inch makes a difference in the position of the shots on the target of about six or seven inches at 500 yards, which increases more and more as the firing points are further removed from the targets. The longer the range the greater is the extent of elevation represented by a degree on the Vernier, so that one-hundred-and-fiftieth at 800 yards represents twelve

inches, at 900 yards thirteen and a quarter, and at 1000 yards about fifteen inches.

When, therefore, so trivial a change in the elevation makes such a marked difference, it is evident that the adjustment of the sliding-bar with the thumb is a practice not to be recommended, although it must be admitted that many good shots do not use the Vernier at all.

### AMMUNITION.

It is always well to take care before using a cartridge to press the bullet firmly with the thumb, to insure that it is home on the powder, as if it is not, as is sometimes the case, accurate shooting cannot very well be depended upon; and probably much of the complaint of the difference in the strength of cartridges from the same packet may have been due to the fact that some of the bullets were not pressed home quite so closely as others, and therefore had a different flight, and no doubt this would be so. Anyhow, it is decidedly safer to make sure that there is no vacant space between the powder and the ball, as there undoubtedly is in some instances, especially with the Martini-Henry.

Some men always place the bullet end of the cartridge in their mouth and moisten it with saliva before placing the cartridge in the breech. The idea is that this has some effect upon the fouling in the shape of moistening it; but I cannot vouch for any advantage in this direction being derivable from the

practice, although it is just possible that there may be something in it.

Every one using a private .450 military breech-loader and wishing to have thorough confidence in every shot, should make his own cartridges. It is true that the process involves both time and trouble, but it is undoubtedly satisfactory to feel from one's own knowledge that all is right within the cartridge itself. Every charge of powder should be weighed in a pair of small apothecary's scales to the fractional part of a grain; 75 grains is quite enough, as it gives a low trajectory without excessive recoil, *i.e.* if black powder be used.

Full directions as to using the cartridge-making implements accompany each set, so that it is not necessary to detail the different processes of re-capping, resizing, cleaning the cases, etc., though I may perhaps state that a strong solution of ordinary washing soda in hot water is a very good cleansing fluid for used cases.

The following system of loading gives highly satisfactory results:—

Weigh 75 grains of black powder accurately, pour it into the case, settling it down with several taps; insert a thin card wad; then two thicker felt wads to serve in clearing out the grooves; then a solid wax, or mixture of wax and tallow, lubricating wad; upon this place another thin wad, and then the bullet, pressing it home with the proper implement, and taking care not to force it too far down and thus crush the grains of the powder.

I am inclined to recommend a mixture of wax and tallow—in the proportion of two parts of wax to three of tallow—as wax alone is somewhat “cloggy.” With the two thick wads between the lubricating tallow and wax and the powder, the latter cannot be affected by the grease even on the hottest day, while the easily melted grease thoroughly moistens the fouled grooves in its passage through the barrel on the discharge of the rifle. The two thick wads in rear are then better able to do their work of cleaning the grooves, and under such circumstances the barrel never needs to be “wiped out,” but each shot prepares the barrel for the succeeding one as effectually as the cleaning rod. *Modus operandi*:—Melt two penny candles—one white wax, the other tallow; pour on to a plate or tin tray an equable depth. When it sets cut out a disc by pressing the cartridge-case (already filled with powder and two felt wads) into the preparation; then put on a thin card wad and press down; then insert the bullet. This saves tenpence each hundred rounds, and answers the purpose better than the pure wax wads.

## THE POSITION.

## STANDING.

The standing position ought really to be abolished as far as rifle prize competitions are concerned, as it must be borne in mind that under scarcely any circumstances could firing be done standing with an enemy 200 yards off, unless, indeed, from behind a wall, in which case the rifles would naturally be rested on its parapet; the argument being that, if the shooting is to be from the shoulder at all, an artificial rest, to represent the wall, should be allowed. Decimation would be the almost instant result of returning the fire of an enemy, 200 yards off, from the shoulder; more especially if, as would be likely, that enemy were ensconced behind stones, or in a shelter trench lying prone with the earth.

The firmest position which can be taken standing is that secured by following out, almost in their entirety, the orders laid down in the Firing Exercises, at least as regards the final phase of the position. The body should be turned to the half, or three-quarters, right; the left foot should be advanced about ten inches or a foot to the left front, *i.e.* straight in front of the centre of the left side when the body is turned, and the toes of this foot should



point straight towards the targets. The right foot should be at least ten inches in rear of the left heel, and should point to the right at a direct angle to the left foot. This gives a firm pedestal to the body, which should be erect and firmly braced up, every muscle being kept as taut and as firm as possible.

The rifle should be pressed firmly into the middle of the shoulder, the right elbow being raised to a level with the neck, thus arranging the muscle of the shoulder so as to form a compact padded bed for the butt. The heel of the butt should, properly, be in a line with the top part of the shoulder.

The left arm should be brought straight under the rifle, and its upper portion, to the elbow, should be firmly rested on the left breast, as by doing this the rifle can be held much more firmly than when the left arm is unsupported.

A pocket-book or a spare packet of ammunition in the left breast-pocket will be found of great assistance to some men in securing a firm resting-place for the left arm on the breast.

There is no harm in allowing the body to bend slightly backwards, which, indeed, is sometimes a great help in gaining a perfectly steady and comfortable position; but care should be taken not to disturb the proper equilibrium in the slightest degree. Leaning forward should be especially avoided, as it is impossible to aim steadily if this is done.

If this position is maintained, there is no fear of sore shoulders from the recoil of the rifle, more especially as raising the right elbow straight with

the shoulder effectually covers the shoulder-bone with a fleshy, muscular pad, and thereby preserves it from the kick.

### KNEELING.

This is essentially a military position, and there is only one position which can well be adopted on the knee, and that is the so-called "Hythe position" pure and simple.

This position is a rickety one at its best, and if it were still in force we should not see the splendid average shooting which now takes place at Bisley and elsewhere, and fortunately it is used for little else except volley firing and for firing at 300 yards in the third class.

Among shooting men it is pretty generally wished that both the kneeling and standing positions were relegated altogether to "the limbo of the past," with the muzzle-loaders which rendered the positions necessary.

When firing kneeling at the target, it gives marked increase of stability if a hole a couple of inches deep is made into which to put the right toe, so that the weight of the body, when seated on the heel, may be supported by the instep, the leg resting level upon the ground, instead of bearing solely upon the right foot, which is, under such circumstances, almost bent double.

Of course, if an especially thick-soled boot, or even

a wooden Lancashire clog, is worn, the discomfort is not so great.

### ANY POSITION.

It is somewhat surprising to see into how many different forms the human body can be contorted under this name.

### THE BACK POSITION.

Excellent shooting is done lying on the back, and this position must of necessity be a very steady one, as the rifle rests firmly upon a ledge formed by the crossed legs.

There are, however, very serious drawbacks, and no one can hope to do *uniformly well* from the back without a very considerable amount of practice.

The most important drawback is that when lying on the back it is almost impossible, without the aid of a spirit level, to preserve the sights in an exactly vertical position. They seem to the firer to be all right, and perfectly upright, when they are really sloping to a fatal degree, and such as to be quite subversive of good shooting; and this is not the worst, for there is no method in the slope which *appears* to be upright, as the sights may present the same upright appearance when bearing to the right for one shot, as they do if bearing to the left for the next. There is, therefore, no possibility of counter-acting a *known* tendency to bear in any one direction.

When firing from the back, it is a good plan to take the edges of the targets as a guide that the upright sight is perfectly perpendicular. This should be done before taking the aim, and if the upright flap of the backsight is made to describe a line parallel to that of the target's edge, it may be pretty certainly concluded that the sight is vertical.

When practising, the aid of a friend in the rear should be secured to indicate any defect in the aim, until the tendency to slope the sights has been finally overcome.

In shooting from the back the legs are usually interlocked, the bottom part of the left being passed under the knee of the right leg, which is bent round so that the right calf may hold the left leg firm in its place.

The rifle is laid in the notch thus formed, and, as a first guide to uprightness, care should be taken *before lying back* that the rifle rests uprightly in this position; but every possible attention will still have to be subsequently devoted to the preservation of this necessary verticalness, as the firer is very apt to unwittingly move the rifle sideways when aiming.

A further drawback to good shooting from the back is the great strain on the unsupported muscles of the neck when aiming, which induces a kind of tremulous motion which is, of course, seriously detrimental to the score; and, indeed, a considerable proportion of men are physically incapacitated from shooting in this position at all.

In firing from the back, the butt of the rifle is

placed in different positions. In what is called the Farquharson position, it is placed in the hollow of the armpit, the head being raised from the ground entirely without support.

A very good position to adopt on the back is that now called the Fulton position, being the one used by the gentleman of that name in the American Team. In this position the rifle finds a rest upon the extended legs, and the butt is passed a little behind the back of the head. The left arm is passed behind the head, and the left hand grasps the butt round the heel-plate, and at the same time the left arm forms a kind of pillow for the head. The upper part of the right arm rests on the ground, and the rifle is grasped at the small by the right hand in the usual way, the trigger being pulled with the forefinger as in ordinary positions. The eye is not too far removed from the sight, being in the same relative position as usual, and altogether this seems the most feasible of the several back positions ; and if the sights could but be kept upright, without a spirit level to gauge by, it would, no doubt, be a capital one to adopt, though the shape of the military rifle stocks is somewhat against it.

Another good mode of holding the rifle when shooting from the back is to lay the upper part of the right arm on the ground at right angles to the body, and firmly grasp the butt round the heel-plate with the *right* hand, the trigger being either pulled or pushed with the thumb of the left hand, the left arm passing over the top of the chest to

allow this to be done. With practice it is possible to secure good results when adopting this form of "any position."

The foregoing will give a pretty accurate general idea of the several modes of applying the back position, which can, however, be still further varied at pleasure; but I must say that, having given a fair trial to the most distinctive features of shooting from the back—doing excellently for a few rounds when I have chanced to secure the proper position and uprightness of the sights, but marring the score with occasional misses and wide shots—I find that, on the whole, I can secure much more reliable results when shooting lying on the stomach. It is, however, evidently *the* position, especially at extreme ranges, judging by the high scores made by men who shoot from the back.

It may be mentioned that some shots, using the back position, lay both legs parallel but slightly bent at the knee, and place the rifle over the top of the left leg, instead of resting it in the angle formed by the legs being crossed as in the other positions; others, again, keep the sling on the rifle rather slack, and, as it were, by this means strap the rifle to the legs by passing the left leg through the loop formed by the sling.

### PRONE SHOOTING.

When shooting from the stomach, the head and eyes are in the same relative position to the sights

as when kneeling or standing, and there is consequently—the arrangement being more natural—less trouble in aligning the sights uprightly and keeping them so, than when lying on the back, with the face tending upwards, and with the eye turned downwards, instead of upwards, or gazing straight forward as with the other positions. The head, when shooting from the stomach, is in a natural position, and the whole body is perfectly at rest, the two elbows being firmly planted on the ground, thus forming a strong support for the upper part of the body and the rifle.

The legs and body should be laid, *bearing well away to the left, at a half right angle* to the direction of the range.

The left forearm should be straight and planted directly under the rifle, so as to form an almost immovable rest, and especial care should be taken that both elbows have a perfectly secure resting-place, and are kept in position without any possibility of, or tendency towards, slipping. When shooting from a turf firing point this is readily secured, even without a shooting bed, as it is generally easy to make an indentation in which to rest each elbow; and under such circumstances—as, for instance, on Bisley Common—if any shooting bed is used at all, the very best that can be brought into requisition is the ordinary waterproof ground sheet, or other similar thin material, which allows of the benefit of the soft grassy ground being obtained through it, and which is not of a slippery nature itself.

The right shoulder should be raised as much as possible, and the right elbow planted a little in advance of it, so that the shoulder-bone may be covered with a muscular pad of flesh, thus forming a bed for the butt, and at the same time preventing a bruised shoulder, which one is liable to get if the rifle recoils direct upon the shoulder-bone. The act of planting the right elbow well forward and raising the shoulder is found to arrange such a pad for the firmer position to be taken.

The body should never lie in a line with the range when aiming, as such a course involves a somewhat cramped position, especially as regards the upper part of the body and head, and the firer is apt when lying straight to rest the butt against the top of the shoulder, with the inevitable consequence of a very painful bruise on the shoulder from the recoil.

In the "prone" position, as well as when standing or kneeling, the head should be thrown back as far as possible. The V sight when the flap is down is about two inches further from the eye than when the flap is raised for distances over 500 yards, so that the focus is then not so affected; but when the flap is raised the sight is rather too near the eye when the head is laid forward, and therefore, although the cheek is then not in danger from the recoil, as at the short ranges, the head should still be laid back, in order that it may be removed as far from the sight as possible, when a better focus is obtained, and it is consequently much easier to see the foresight standing clearly in relief beyond the backsight,



which is not the case when the eye is too close to the backsight.

The stomach position in target shooting has this advantage, that it is a strictly natural one, and involves no contortions or constrained configuration of any part of the body, and it is therefore very readily fallen into by the merest tyro; and as in this position the sights can be well overlooked, and their absolute verticalness safely preserved with little difficulty, there is no doubt that this is the true position for a marksman, and the best which can be adopted for general usage.

### GRASPING THE RIFLE.

When aiming, the rifle should be firmly grasped with *both* hands in all the "forward" positions, *i.e.* standing, kneeling, and shooting from the stomach, and the whole of the body should be well braced up. The positions of the arms and other portions of the frame have already been described, and it now only remains to mention the grasp with the hands.

In all forward positions the right hand should hold the small of the butt with an iron clutch, the forefinger being well passed round the trigger, so as to secure the maximum power, and the thumb should *point straight to the front*, being placed on the wood base behind the bolt, or upon the bolt lever itself.

The pointing of the thumb straight to the front is apparently a trivial, yet it is a most important point,

as it has the undoubted effect of affording a considerable access of the needed firmness of grasp ; and when the trigger is being pulled, or rather pressed, the action described by the right hand should be as though it were being attempted to press the thumb *into* the woodwork and at the same time to squeeze the trigger, trigger-guard, and the small of the butt into one lump. In fact, the motion should be as though one were squeezing the very last drop of water out of a large sponge gathered in the ball of the hand.

If this is done properly, and it should be practised until it *is* done properly, the feeling is that the rifle could be held without any assistance from the left hand at all. This is, however, only a feeling, as the left hand should also be simultaneously firmly clutching the rifle and holding it hard into the shoulder with the utmost amount of steady muscular force possible. In fact, the rifle should be grasped so firmly with both hands, that should either be removed, if it were possible, there would be no difference in the steadiness of the aim. It is a mistake to suppose that the sole function of the right hand is to pull the trigger.

When shooting at the 200 yards range, it is not possible to pass the fingers over the barrel, as they would in that case obstruct the line of sight, and they are therefore generally pressed "between stock and barrel," the thumb being in the same position as in all forward positions, on the other side of the sight-bed.

## POINT OF AIM.

It is in all cases best to keep well *below* the level of the bull's-eye when selecting the spot at which to aim, as, when aiming away from the "eye," either to the left or to the right, if the back of the bull's-eye is kept *over* the tip of the foresight, it is more easy to preserve the proper elevation, seeing that the relative position of the black, when the sight is taken below it, serves as a better guide than if the foresight were to be allowed to rest upon a point of the target upon the same level, as there would, in the latter case, be the danger of unconsciously getting higher up the six feet of target than was required; while a tendency to descend is counteracted by a careful watch being bestowed upon the relative positions of the bottom of the black bull's-eye and the tip of the foresight.

When aiming "right at" the bull's-eye itself with a black sight, the fear of losing the vertical elevation is augmented, from the fact that if the black foresight is once allowed to impinge upon the equally black bull's-eye, it is lost to view, and the tip of the sight may actually be aligned, either with the bottom or the very top edge of the black circle, without any distinctions being appreciable; and as this represents a difference of two feet, it is a somewhat serious matter.

### SLOPING THE BACKSIGHT.

Those who find it difficult to use the V at 200 yards can obviate the necessity by sloping the backsight to the required angle. It may be supported by "any extemporized means," such as a pencil or folded paper, or it may be adjusted after every shot. When the required angle is secured, the aiming, both as to wind allowance and everything else, is precisely the same as at the longer ranges. The flap may also be thrown back horizontally, which answers nearly the same purpose, but the hand-guard is in the way with the .303 rifle and would have to be taken off.

### AIMING.

Although it is not desirable that the actual aim should be a long one, a competitor desiring to win prizes should take special care that it is not taken in too great a hurry, but should be particularly mindful of the several points which it is essential to attend to in this most critical part of his shooting. It is of no avail to have a good rifle, to practise position drill, to secure a good position, the proper elevation, and the correct allowance, or to attend to the various minutiae already and to be described, if the utmost steadiness and care are not bestowed upon the act of aiming, and if the closest possible attention is not paid to two or three essential details at the last moment.

In fact, as can readily be perceived, the difference between good, medium, and indifferent shots entirely depends upon their respective instinctive application of certain indefinable principles at the actual moment of discharging their rifles; *i.e.* a brilliant rifle shot possesses the indescribable power of unconsciously bringing into active operation certain capacities which are wanting, or not so fully developed, in a shot of more moderate attainments.

This indefinable quality is, in ordinary parlance, designated "steadiness," but this scarcely expresses the actual reality in its entirety. It is true that steadiness is essential, but steadiness alone may be gained by constant position drill; the needful quality may, perhaps, be more properly described as a nervous impassibility, closely combined with an active mental appreciation of certain circumstances—in other words, an intimate connection between the applied functions of the hand, the eye, and the perceptive faculties.

At this stage the minutest possible regard has to be bestowed upon the backsight, the amount of the foresight to be taken, the point of aim, the steady holding of the rifle, the cessation of the breathing, and the pressing of the trigger, and for accurate shooting all this has to be done synchronously, so that the hammer may fall when the pressure on the trigger culminates, while the proper amount of sight is being taken with the whole being perfectly immovable, and with the aim directed exactly and unerringly upon the proper point. The breathing

should always be suspended during the act of taking the final aim before firing, and the actual discharge should be, as it were, quite unexpected.

The more minutely these several points can be attained the closer is the shooting, and upon this, to a considerable extent, the merits of different men as rifle shots hinge. In fact, the proper mastery of the art of shooting arrives, as it were, at a narrow focus when it comes to the actual aiming and firing.

To some it comes naturally, as a "gift;" others must acquire it; but all must practise this final phase to arrive at perfection, and here we gain the advantage derivable from aiming and snapping.

The gaze along the sights to the target must be steadfast and unflinching, and any tendency to flinch at the critical moment should be combated until it no longer exists, as it is a fatal obstacle to steady shooting, seeing that the slightest movement of the muzzle from the exact point of aim represents a serious loss of accuracy.

Both eyes should be open, the right being steadfastly fixed along the sights upon the point of aim, both before, *during*, and *even after* the discharge, and an absolute concentration of all the essential senses during this period is a *sine quâ non* for effective shooting.

It must, I think, be obvious to every one that too much stress cannot possibly be laid upon the importance of this final point, which is in reality the crucial test of the quality of a rifle shot.

All other knowledge of rifle shooting amounts to naught if a man cannot aim and fire properly.

If a difficulty is experienced in getting off a shot, and it is consequently necessary to prolong the act of aiming, it is a good plan to either close both eyes or lift the gaze over the top of the sights, and thus to relieve the eye of any false impressions to which too long an aim may possibly have given rise. In other words, it is safer to start afresh, as far as the eye is concerned, and take a new aim.

If the eye is directed for an excessively prolonged interval of time over the sights, delusive optical effects are liable to be generated ; for instance, it is possible, and indeed probable, that what may seem to be the "foresight" may, in reality, be merely its impression left upon the retina of the eye, the real sight having in the mean time dropped behind the bar.

Anything of this nature is at once counteracted by momentarily directing the gaze elsewhere, or by closing the eye altogether.

If, in the same way, the arms should feel oppressed, never hesitate to bring the rifle down and take a fresh aim in all respects, as it is simply useless to attempt to secure a good shot if either body or eye is affected by being kept too long in position.

When shooting with the Martini-Henry, particular attention should be given to avoid being misled by the upper band, which has much more metal on the right than on the left side, owing to the arrangement for fixing the sword bayonet. This is somewhat apt to interfere with the proper adjustment of the sights, as it deceives the eye if not carefully seen to.

## ELEVATION.

This is a matter so much controlled by varying influences, that it is somewhat difficult to lay down any specific hard and fast rules as a guide in fixing upon the particular elevation which should be used.

It is, however, an all-important item in rifle shooting, and some men are affected to a greater degree by changing conditions of atmosphere and light than are others ; and, again, the different modes of taking sight are variously affected by such changes. The "fine sight" requires the greatest variations, while the use of the fuller sights, and especially the whole of the block, modifies the needed variations to a considerable extent.

As a general rule, however, with the "medium" sight in conjunction with the straight bar, except in the winter, when the normal elevation is as a rule higher, or during any specially marked variations in the state of the temperature or light, or the humidity or otherwise of the atmosphere, the difference between the elevation required, as a general rule, during a season's shooting rarely ranges beyond  $2^{\circ}$  or  $3^{\circ}$  on the Vernier, although on an occasional exceptional day the elevation has of course to be much increased or reduced.

Dull, gloomy, cold weather usually requires something like  $3^{\circ}$  or  $4^{\circ}$  more than the ordinary elevation, but this, again, cannot be laid down as a fixed rule.

Although it is most difficult to lay down any



precise rules as a guide to fixing upon the proper elevation for certain given conditions, seeing that these conditions are so apt to clash together and modify the requirements necessary to counteract them, there are certain *general* rules which serve to govern the elevation which may be required, and these will now be given. The closest attention is, however, necessary, when deciding upon the elevation, to ascertain in how far one circumstance may tend to counteract another ; for instance, if the air is damp and moist, accompanied by a gloomy wintry light, it must be borne in mind that, while the gloomy light should properly necessitate a higher elevation, the moistness of the atmosphere may be such as entirely to neutralize the effects of the light, and if so, only the ordinary elevation should be used. In the same way, if the targets are well lighted up, and stand out vividly white in bold relief against the dark background, lower elevation would be required if there were no counteracting influences ; but if it should so happen that this appearance is accompanied by an intense dryness in the air, necessitating increased elevation, matters are again equalized and the elevation reduced to a normal figure. If, again, the wind blows strongly down the range from the targets to the firing point,—thus, on the face of it, calling for an increase in the elevation of the sights,—and if the sun or the light is much stronger at the firing point than at the target, thus needing still higher elevation—if the general light is inclined to be bright, and the

air is damp and moist and warm—it will not do to aim more than  $1^{\circ}$ , or at the most  $2^{\circ}$ , higher than usual, as the latter appearances will, in a great measure, tend to restore matters to the ordinary equilibrium.

Then, too, if the wind is blowing strongly from either side, while the targets are clear and bright, the increased allowance for the former is reduced by the necessity for lower elevation on the latter ground, and so on throughout the several phases.

The very marked changes which are at times needed are brought about when several appearances requiring the same treatment as regards elevation prevail at the same time. For instance, if there is a strong rear wind—if the targets are lighted up, and appear clear and sharply defined—and if the air is damp and moist, and the light grey and clear—it is necessary to reduce the elevation by  $3^{\circ}$ ,  $4^{\circ}$ , or  $5^{\circ}$ , to avoid going over the top of the target.

While, if the wind is from the front, the targets dim and indistinct, the atmosphere dry, and the light dull and misty, the elevation must be increased in a corresponding ratio, as none of the conditions in either case clash, but all tend in the same direction.

As a general rule, when in doubt as to the exact amount of elevation required, it is always the safest plan to err on the side of elevating for a *low* shot to start with than a high one, seeing that if the bottom of the target is struck by the first shot, the sight can be at once raised, and the elevation thus rectified ; while even a recorded ricochet, however annoying it

may be, is still better than going over the top of the target altogether, as one, at any rate, in such a case secures a knowledge of where his shot *has* gone, and is consequently able to adjust matters so as to avoid a recurrence ; whereas, if the ball flies over the top of the target there is no sign given at all, and, as it is impossible then to know *where* the shot has struck, there is the chance of throwing away a second, or even a third shot, from the uncertainty which exists as to the fate of the preceding shots.

The following are a few leading rules which regulate the elevation, 500 yards being taken as the basis.

NOTE.—It should always be borne in mind that the cordite powder becomes more active when heated.

### SIDE WINDS.

A strong wind blowing directly across the range in either direction has a tendency to depress the flight of the bullet, as well as to diverge it, and therefore from  $1^{\circ}$  to  $2^{\circ}$  higher elevation should be allowed, according to the greater or lesser strength and *bearing-down* properties of the wind ; and it must always be borne in mind that it is not always the strongest side wind which depresses the flight of the bullet the most, as some winds have more of a downward tendency than others. The nature of the prevailing wind in this respect may, to some extent, be ascertained on a flat range by watching the

smoke of the previous shot, to see whether it is carried upward or downward, or along the surface of the ground. A strong side wind has a marked effect upon the light-weighted .303 bullet, and the allowance for such a wind has to be increased. With smokeless powder, however, this guide is lost, but a cigarette or pipe might be utilized at need.

### REAR WINDS.

A wind from the rear must necessarily, to a certain degree, assist the bullet in its flight, as, although the ball travels much faster than any wind can do, when the air is bearing in the same direction as the bullet there must of necessity be less resistance to its flight than under other circumstances, and therefore the elevation should be reduced proportionately to the apparent force and speed of the wind. This rarely exceeds  $1^{\circ}$ , but sometimes when the rear wind is very strong,  $2^{\circ}$  would not be too much with the .450, but with the pencil-like Lee-Metford bullet the allowance would be practically *nil*.

### FRONT WIND.

A wind from the front has, of course, a directly contrary action (although in a less marked degree) to a rear wind, as the bullet meeting the air, which is travelling in the opposite direction to its flight, has a considerable access of resistance to encounter, and

thus its course is much impeded, and, according to the power of the wind, from  $1^{\circ}$  to  $2^{\circ}$  more elevation should be used for an ordinarily strong breeze; but when a strong wind (S.), or a gale or very strong wind (V.S.) is blowing, it may, at times, be necessary to increase the allowance still more.

Both front and rear winds are, however, very baffling, and it should always be remembered that it is best to aim low in preference to too high under such circumstances, although with the slim pencil-like .303 bullet much of this difficulty is removed.

### DRY AIR.

When the atmosphere is dry, the effect is, in the first instance, to need a higher elevation; but when this state of things is prevalent, it is usually accompanied with a clear sharp light, so that the first effect is to a great extent counteracted. A dry atmosphere, however, dries the fouling of the barrel, and, if it is warm at the same time, heats the barrel also, so that, as a general rule, it may be taken for granted that when this is the state of things the elevation should be increased to a slight extent, i.e. from  $1^{\circ}$  to  $2^{\circ}$ , especially when east or north-east winds (usually dry winds) are prevalent. Blowing down the barrel from the muzzle after each shot is desirable under these conditions to soften the fouling; but if the barrel be very heated, never insert a cordite cartridge until the moment of firing.

### CLEAR LIGHT.

When the light is clear and bright, and the targets appear to be more distinctly visible than usual, the elevation should be somewhat reduced, as under such conditions the foresight is also more readily perceived, and as much as  $2^{\circ}$  difference is needed at times by this state of the light, after allowing for any counteracting influences which may also prevail.

### DULL LIGHT.

When the light is dull and gloomy, on the contrary, if care is taken that more foresight than usual does not appear over the backsight, the elevation needs to be increased, as the targets appear to the eye to be much smaller and further away.

The natural tendency under such circumstances is, however, to unconsciously take in more of the foresight; but this should of course be controlled as much as possible, and the endeavours should be directed to maintaining the sights in their usual relative proportions.

### HUMIDITY.

The darkness of the light is oftentimes accompanied by much moisture or humidity, as, for instance, during damp and rainy weather, and under such circumstances the decrease in the allowance necessitated by the humidity, as operating upon the

fouling, tends in a great measure to counteract the increased elevation which would otherwise be rendered necessary by the darkness of the surroundings.

### FLEETING CLOUDS.

Sometimes, when shooting, there are clouds constantly passing over the sun, or if the sun is not visible, first darkening the scene and then lighting it up. Under such circumstances the rifleman has to be very wary indeed, or otherwise he will make very uncertain shooting. For instance, if the sun suddenly comes from behind a cloud and shines full upon the targets, or if a strong light is thrown upon the targets, while clouds obscure the firing point, and consequently the firer's sights, if the aim or elevation is not lowered about  $2^{\circ}$ , the shot will be very likely to fly right over the top of the target; and, in the same way, if the firing point and the sights are suddenly illumined by the rays of the sun, or a more vivid light, while the targets remain in comparative obscurity, if the aim or elevation is not raised about  $2^{\circ}$ , the result will be a low shot or a ricochet.

### HAZE.

On a hot day, especially if there has been any rain just previously, or a dewy night, or if there is damp ground between the firing point and target, the exhalations from the ground assume the appearance of clear water, as can easily be observed through

a glass and even with the naked eye at Bisley and other similar ranges in the summer time. The optical effect of this is to cause the visible, and to all appearances the real, target to stand at an altitude much higher than is occupied by the actual target which it is intended to strike—much in the same way as a coin can be seen at the bottom of a basin of water from one side—and therefore, in order that the shots may drop lower down and upon the spot where the real target is, the elevation should be lowered from  $2^{\circ}$  to  $3^{\circ}$ . The effect of the haze is not solely vertical, but sometimes, when a side wind is prevalent, it has the effect of diverging a refracted image of the target to the right or to the left, as the case may be ; and therefore, irrespective of the wind itself, it is under such circumstances necessary to allow for a horizontal deviation in addition to that required for the wind alone, so that the allowance is proportionately increased.

This haze is a most baffling affair, and is one of the plagues of shooting ; but by careful attention it is possible to overcome it, although many good shots find it a sad drawback to success when competing for the most important of all prizes—the Queen's Prize—on a hot July day.

### REMARKS ON ELEVATION.

It can readily be understood that the elevation is a matter which requires somewhat careful study,



and a would-be successful shot must have his impressions on the *qui vive* when at the ranges to secure in his mind's eye the actual conditions prevalent, so as to assure himself whether all tend in one direction, or whether one feature counterbalances another, so as to reduce matters to a normal condition, or otherwise. By a little practice and observation this comes quite naturally, particularly when the general rules are kept well in mind ; and as, under ordinary circumstances, from  $1^{\circ}$ ,  $2^{\circ}$ ,  $3^{\circ}$  covers the varying requirements as regards elevation, a careful, painstaking recruit will soon master the initial difficulties attending this branch of rifle shooting.

Before leaving the subject, I would draw renewed attention to the one particular point—viz. the strict necessity which exists for keeping a sharp look-out to see whether all the prevalent conditions tend towards the same thing, as, if so, there is a marked change needed in the usual allowance.

On a hot, dry day it is advisable to raise the sight  $1^{\circ}$  (or hundredth) after the second or third shot, and another degree after the fifth shot, and so on, to prevent the bullets dropping lower, owing to being retarded in their passage through the barrel by the hardened fouling. It is much better to raise the sight by means of the Vernier, than to aim higher on the target or to take a fuller sight, as anything in these latter directions must be more or less indefinite, while if the sight is raised on the Vernier  $1^{\circ}$ , we know it is  $1^{\circ}$ , neither more nor less.



## WIND ALLOWANCE.

In allowing for winds there is a marked advantage in using the flat bar of the slider of the backsight as a wind-gauge, as it must be evident to every one that better shooting can be secured when aiming dead on or near the bull's-eye, than when aiming quite away from it ; but, in order to meet the views of those who prefer the V to the straight bar, the allowance will be quoted for both systems.

When studying the strength of the wind, it must always be borne in mind that it is not the invariable rule that that which is to all appearances the strongest, *i.e.* that which *seems* to be the strongest in its influence upon the body, has the greatest effect upon the deviation of the bullet. A wind may be blowing which every now and again seems as though about to blow one down, or, at any rate, to carry away one's hat, and which has a decidedly unpleasant effect upon the aim when shooting standing, and yet this same wind may have little, if any, more effect upon the actual deviation of the bullet, than another description of wind, when none of these especially unpleasant symptoms present themselves.

At times there is what seems a gentle, zephyr-like breeze, which fans the face with a steady, continuous pressure, and one is apt to conclude that for this wind but little allowance is necessary ; but the fact is, that just as great an allowance may really be

required as for the blustering, tear-away wind just mentioned. This is due to the fact that, under such a state of things, the whole atmosphere may be moving bodily across the line of fire, and under such circumstances the incessant and uniform divergent pressure in one direction tells in a marked manner upon the bullet, until the effect is the same as though there were several powerful blasts for the ball to pass through, as in the case of a strong, blustering wind.

In fact, this is nothing more nor less than an exemplification of the fact that a steady, continuous pressure has as much effect as a repetition of more powerful pushes.

In deciding upon the nature of a prevailing wind it is absolutely necessary, therefore, that this should be borne well in view.

In endeavouring to lay down the exact allowance, both with the V and the straight bar, it will, no doubt, be more clearly understandable if each of the winds, as already classified, is taken in its turn.

### (Z.) A CALM, OR SCARCELY-MOVING ZEPHYR.

For a wind of this description—if it can be called a wind—with a bearing from left to right, or up or down the range, the aim should be just under the left bottom segment of the circle described by the round bull's-eye, or what I will call “dead on.”

Unless there is a *decided tendency* to bear from the

right, even a right wind of this description would be met by aiming at this point ; but if there is such a marked right to left tendency, then the aim should be taken under the right bottom segment of the bull's-eye.

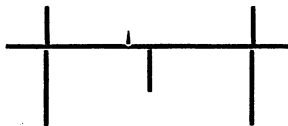
With the straight bar used as a wind-gauge, the sight should appear exactly over the centre line and the aim should be "dead on."

### (G.) GENTLE WIND.

If from the left, the aim should be, as nearly as possible, just within the left centre line, just under the bull's-eye.

If from the right, it should be a trifle nearer to the bull's-eye itself—in fact, just to clear it.

With the wind-gauge on the straight bar in the case of a left wind, the foresight should appear over the first point which would be given if the portion of the bar on the left side of the centre line were divided in three equal portions, the actual aim being taken as though "dead on," thus—



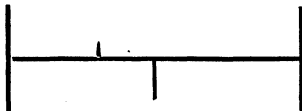
If from the right, the foresight should be a shade nearer the centre line.

## (M.) MODERATE WIND.

If from the left, the aim should be just *on* the target, so as to keep the foresight aligned upon a white surface.

If from the right, it would do to aim about the right centre line—if anything, however, nearer the edge of the target than otherwise.

With the wind-gauge allowing for a left wind, the foresight should appear over the point nearly *half-way* between the centre line and the upright, the foresight being directed “dead on,” thus—



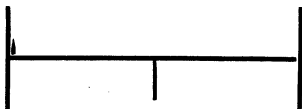
If the wind is from the right, half-way between the centre line and the upright would be amply sufficient.

## (F.) FRESH WIND.

If from the left, the aim should be just off the edge of the target, really about two feet; but if the foresight is kept close to the white edge, with a decided interstice of black between them, this ~~will~~ meet the case.

If from the right, the foresight may be nearer the white edge of the target.

With the wind-gauge, the tip of the foresight should be carried towards the upright flap and the aim taken "dead on," thus—



If from the right, a little grace may be allowed.

The Martini allowance would be decreased in relative proportion to preceding examples.

### (S.) STRONG WIND.

If from the left, the aim should be calculated about half a target off the edge of the target; and if from the right, slightly less.

With the wind-gauge, if from the left, the aim may be taken with the foresight appearing as for the F. wind, *i.e.* close to the upright, with the point of aim removed from the bull's-eye itself to a point near the left centre line, but, if anything, rather nearer the left edge of the target.

If the wind is from the right, the foresight should appear over the same relative place as described for a left wind, but the aim may be taken a trifle nearer the bull's-eye.

## (V.S.) VERY STRONG WIND.

From the left. For an ordinarily "very strong wind," beyond the categories already mentioned, the aim should be taken about the width of the target itself from the left edge, which, is, of course, a matter of calculation.

From the right. About the same thing, although the allowance should be proportionately decreased, as shown in the preceding instances.

In the case of a right wind, with the wind-gauge, the foresight should appear, as in the preceding cases, close to the uprights, the aim being taken about the edge of the target, more off the edge than upon it if the wind is from the left, but close upon it if from the right.

## VIOLENT WINDS.

For allowances for winds beyond the strength mentioned, which are, however, very rare, the aim should be taken proportionately further removed from the bull's-eye ; but the foregoing instances will, no doubt, serve as a clear guide as to the necessary increased allowance required under such circumstances ; and the same also applies to winds blowing from intermediate points, which have to be proportionately allowed for.

## REMARKS ON THE ALLOWANCE FOR WIND.

Of course, when the  $V$  is used, the aim should be proportionately increased for 600 yards—approximately about two-thirds as much more—as the above allowances are only applicable to 500 yards. As regards the straight bar wind-gauge, however, the same aim will practically be found to meet all distances, if the wind is unchanged, or very nearly so.

As a general rule, it is found that a wind from the right requires rather less allowance than one from the left—probably due to the drift of the ball towards the right, or perhaps to a tendency to “pull” to the right, either of which, to a great extent, counteracts the divergent force of the wind, and renders less allowance necessary.

## CHANGES IN THE WIND.

It frequently happens, when shooting, that the wind suddenly changes, either in direction or strength. It is very important that such variations should be watched, and the necessary allowance made to counteract them, otherwise the score will suffer. Take care, however, that the change is a permanent one for the time, and not a transient gust or lull which is of only momentary duration. On most ranges there are some features known to the habitué—and where these features exist, it should be the



care of the would-be shot to make himself acquainted with them—which serve as a good guide for the detection of any sudden variations in the wind.

At Bisley, the best thing to go by is the little red flag upon each of the butts, and it will well repay the trouble if a careful look is taken at these flags through a binocular before firing each shot (the flags cannot well be discerned sufficiently clearly with the unassisted eye), as any change in the position of these flags usually indicates a corresponding change in the force or direction of the wind which may just then be prevalent. The flags on the butts are more useful guides than the larger ones flying all over the common among the tents, which look like atoms in a kaleidoscope from the more distant firing points, and are somewhat confusing in their many-coloured multiplicity.

No hesitation should be felt in allowing for a marked change, likely to last—even if the previous shots have been bull's-eyes—more particularly if the flags at the butts and down the range corroborate each other in their testimony, and both show that the wind has changed in a certain particular.

### RANGE PRACTICE.

To secure useful practice when not prize shooting, an effort should be made to fire in series of shots, either by fives or sevens, so as to compare the scores, and also to get accustomed to firing the stipulated number of shots in their proper order.

The best possible mode of practice is for a number of men to get up a sweepstakes, and fire five or seven shots through the ranges. This gives the same zest and excitement, and generally the same experience, as though actually shooting for prizes, and is a system well calculated to improve every one concerned for shooting in any ensuing competition.

In London and in some of the large towns there are now rifle clubs, which afford their members facilities for securing most useful practice; the North London Rifle Club, for instance, whose members compete weekly at Ilford.

### SPECTACLES.

Some men who *can* shoot tolerably without glasses, but who do not see their sights distinctly, would find much assistance in the way of a clearer definition, if they were to use glasses, whether it be spectacles, or simply a single eye-glass for the right eye.

These glasses can be procured "smoked," so as to give the landscape the appearance, however dazzling the light may actually be, of being dull and overclouded—obviously a great advantage.

A large number of Volunteers use glasses, many of them being among the best shots, and the writer would advise any man who experiences a difficulty in seeing clearly and distinctly through the sights to adopt the glasses; but he would strongly advise an oculist being consulted, as eyesight varies so much.

While upon the subject of optics, I may as well

state that the eyes may be strengthened and the sight much improved by a very simple course of procedure at home. It is as follows :—Prior to performing the matutinal ablutions, half fill the wash-hand basin or bath with clear, cold, clean water. Then immerse the face with the eyes *open*, and after gazing a while at the bottom of the basin or bath under water, open and shut the eyes several times. If this is done once or twice every morning, it will be found that the eyesight is much benefited.

### SMOKING.

Smoking is decidedly not calculated to help a man to become a first-rate shot, especially smoking to excess, as it has an undoubted tendency to affect the nerves. At the same time, many of the best shots are habitual smokers, so that it would be too much to say that *any* man who smokes cannot shoot ; but it is generally admitted that a man who eschews the weed is more likely to shoot well than one who uses it, although this is very much a matter of constitution. Anyhow, if a man is accustomed to smoke, he should smoke his usual quantity on the day of a competition, and not leave it off for the day, as such a course is apt to disturb his normal condition—which is, of course, a thing to be avoided.

Another point, while upon this subject, which should be stated, is that, if a man usually smokes “Returns,” it will be very unadvisable on his part to

smoke "Cavendish," or "Shag," or a cigar just before a competition.

### "NIPS."

It is not advisable for a man who is not habituated to it "to irrigate," as the Yankees say, just before shooting, as the act of taking a nip of spirits has, in such cases, an effect contrary to that desired, and a man who cannot shoot without "Dutch courage," should not shoot at all. Still, many of our Northern brethren like a "drap o' whusky"—and truly the results they secure at the N. R. A. meeting, as a rule, show that it does them no harm, but rather the reverse—and probably those who are accustomed to it will find no ill effects from a wee "nip;" but it is to be hoped that the younger shots, on whose behoof these pages are principally written, are not so well seasoned in this respect, and therefore it is well that they should beware ere they take spirits just before shooting, under the impression that it will give them nerve and steadiness, for this it will most assuredly not do.

A glass of beer half an hour or so before shooting will not, as a rule, do any harm, and it may even in many cases do good, but the practice of taking a pocket flask to the firing point cannot but be prejudicial.

The best thing to drink if a man is thirsty, and on a hot day, is either water or claret, which answers

every purpose, and does not induce any undue sur-excitation of the nervous system.

When about to shoot, however, the best plan that can be followed is to eat, and drink, and smoke exactly according to the usual custom, so that the whole being is pretty nearly in the ordinary and normal condition, and then there is a far better chance of doing well at the targets.

## CONCLUSION.

I hope that I have been able to afford sufficiently definite information upon the subject of Rifle Shooting that will enable my readers to form for themselves individually more precise rules for their guidance; and if I have succeeded in doing this (and it is as much as it is possible to do upon a subject where so much depends upon each individual himself, and where there are so many matters operating in contrary directions) I shall be satisfied. It is not as though there were any hard and fast rules to be laid down, which would be applicable to all, and under all circumstances (and it must be fully obvious to every one that there are not, and cannot possibly be such precisely definable conditions); and therefore all that can be said upon the subject of Rifle Shooting must be more or less indefinite, and subject to varied applications, according to cases and circumstances.

H. SMITH.

*January, 1900.*

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